CLAIMS

1) A method of measuring local similarities between a certain number p of seismic trace cubes obtained by seismic exploration of a single volume of an underground zone, characterized in that it comprises the following stages :

a) extracting, from each seismic trace cube, a volume neighbourhood centred on a single current point and consisting of a set of seismic traces in limited number,

b) applying the GPCA analysis technique to groups of seismic attributes extracted from the seismic traces of said volume neighbourhood so as to form synthetic variables,

c) determining a coherence value from the synthetic variables, which is assigned to the current point;

d) repeating stages a) to c) for each point common to the various cubes, and

e) grouping all of the coherence values so as to form a coherence cube showing said similarities.

2) A method as claimed in claim 1, characterized in that, for each point, the coherence value taken is the mean value of the squares of the correlations between a limited number k of synthetic variables and their projections on the cubes in the neighbourhood of the current point.

3) A method as claimed in claim 2, characterized in that the value of the number k of synthetic variables is determined as the smallest number of synthetic variables allowing to reach a variance threshold explained by the projections of the synthetic variables on each cube, this threshold being previously selected.

4) A method as claimed in any one of the previous claims, characterized in that a number k of synthetic variables is selected depending on their correlations with the groups of attributes associated with the volume neighbourhood of the current point, the coherence value assigned to the current point being equal to the weighted sum of the squares of the correlations between the synthetic variables considered and their projections on the cubes in the neighbourhood of the current point.

5) A method as claimed in claim 4, characterized in that, for a determined correlation value, the weighting value selected is the variance percentage explained by the projection of the synthetic variable on the corresponding group divided by the sum of the variances of all the projections of the synthetic variables considered on the same group.

6) A method as claimed in any one of the previous claims, characterized in that a threshold is set on the variance percentage explained by the projections of the synthetic variables on the cubes in the neighbourhood of the current point to be taken into account, the coherence value being then equal to the weighted sum of the squares of the correlations between the synthetic variables and their projections on the cubes in the neighbourhood of the current point, so that the number of synthetic variables taken into account allows this threshold to be reached.

7) A method as claimed in claim 6, characterized in that, for a correlation value, the weighting value selected is p times the variance threshold selected, p being the number of seismic cubes considered.

8) A method as claimed in any one of the previous claims, characterized in that a volume neighbourhood is extracted from seismic trace cubes obtained after a 3D seismic survey, each one corresponding to the same incidence angle.

9) A method as claimed in any one of claims 1 to 7, characterized in that a volume neighbourhood is extracted from seismic trace cubes obtained after a 3D seismic survey, each one corresponding to the same offset.

10) A method as claimed in any one of claims 1 to 7, characterized in that a volume neighbourhood is extracted from seismic trace cubes obtained by successive seismic explorations of the zone.

11) A method as claimed in any one of claims 1 to 7, characterized in that a volume neighbourhood is extracted from residue cubes obtained after a prestack stratigraphic inversion.

12) A method as claimed in any one of claims 1 to 7, characterized in that a volume neighbourhood is extracted from residue cubes obtained after a poststack stratigraphic inversion.

13) A method as claimed in any one of claims 1 to 7, characterized in that a volume neighbourhood is extracted from prestack or poststack inverted trace cubes and from residue cubes.